**Ideation Phase:**

**Define the Problem Statements**

|  |  |
| --- | --- |
| Date | 31 January 2025 |
| Team ID | LTVIP2025TMID38289 |
| Project Name | Classifying Fabric Patterns Using Deep-Learning |
| Maximum Marks | 2 Marks |

**IDEATION PHASE: Fabric Pattern Classification using Deep Learning**

**1. Problem Statement**

**Title:** *Automated Fabric Pattern Recognition Using Deep Learning*

**Problem Context:**

In the textile industry, classifying fabrics based on patterns is a labor-intensive, manual, and often inconsistent process. The demand for smart inventory systems, automated quality control, and intelligent fabric search engines is rising. Currently, industries rely on human experts to visually inspect and categorize fabric patterns like floral, geometric, abstract, plaid, striped, etc. This process is slow, prone to human error, and not scalable.

**Core Problem:**

"There is no scalable and accurate automated system that can consistently classify various fabric patterns from images, leading to bottlenecks in textile design retrieval, production sorting, and inventory categorization."

**Objective:**

To develop a deep learning-based image classification system that can identify and classify fabric patterns from images into predefined categories (e.g., Floral, Geometric, Stripes, Plaid, Abstract, Plain, etc.) with high accuracy and speed.

**2. Goals and Scope**

| **Goal** | **Description** |
| --- | --- |
| ✅ Automate Pattern Classification | Replace human judgment with a deep learning model that can classify fabric patterns. |
| ✅ High Accuracy & Generalization | Model should work under varied lighting, textures, and noise conditions. |
| ✅ Real-time Classification | Classify fabrics quickly from image input for integration in industrial systems. |
| ✅ Scalable Dataset Integration | Should support training on growing datasets from textile companies or fashion repositories. |

**Creative Diagram Concepts**

**A. System Workflow Diagram**

[Fabric Image Input]

↓

[Preprocessing]

(Resize, Normalize, Augment)

↓

[Deep CNN Model]

(ResNet / MobileNet / VGG16)

↓

[Prediction Layer]

(Softmax for Category Scores)

↓

[Output: Classified Pattern]

(e.g., Floral, Plaid, Stripe)

**B. Problem Context Infographic**

You can represent the issue in this 3-part visual:

[Manual Sorting]

- Slow

- Subjective

- Costly

↓

[Our Solution: Deep Learning Classifier]

- Fast

- Consistent

- Scalable

↓

[Textile Applications]

- Smart Inventory

- Visual Search

- Quality Control

C. **Dataset to Deployment Pipeline:**

[Dataset: Fabric Images]

↓

[Labeling: Category Annotations]

↓

[Model Training]

(Deep CNN / Transfer Learning)

↓

[Evaluation & Tuning]

↓

[Deployment in Industry Apps]

(Mobile, Web, Embedded)

4. Possible Pattern Categories

| **Class ID** | **Pattern Type** |
| --- | --- |
| 0 | Floral |
| 1 | Geometric |
| 2 | Stripes |
| 3 | Plaid |
| 4 | Abstract |
| 5 | Dotted |
| 6 | Plain |
| 7 | Animal Print |
| 8 | Paisley |
| 9 | Ikat |

**5. Real-World Use Cases**

* **Textile Manufacturing** – Automatic fabric categorization in production lines.
* **E-Commerce** – Visual-based search for clothing by pattern.
* **Tailoring & Boutiques** – Faster digital cataloging and inventory handling.